

WHAT IS CLAIMED IS:

1 1. A wavelength division multiplexing optical
2 repeating transmission method for performing repeating
3 transmission of a wavelength multiplexed optical signal
4 along an optical transmission line interconnecting a
5 terminal apparatus for transmission and a terminal
6 apparatus for reception and having a repeating interval
7 divided by a plurality of repeating apparatus, comprising
8 steps executed by each of said repeating apparatus disposed
9 at end points of the divisional repeating intervals, the
10 steps including:
11 a first dispersion compensation step of compensating
12 for a dispersion included in the wavelength multiplexed
13 optical signal having propagated in the divisional
14 repeating interval on the terminal apparatus side for
15 transmission so as to be included within a tolerance set
16 in advance;
17 an optical add/drop multiplexing step of performing
18 an optical add/drop multiplexing process for each of
19 wavelength components of the wavelength multiplexed
20 optical signal for which the dispersion compensation
21 process has been performed at the first dispersion
22 compensation step; and
23 a second dispersion compensation step of performing
24 a dispersion compensation process with an over
25 compensation amount for the wavelength multiplexed optical

26 signal for which the optical add/drop multiplexing process
27 has been performed at the optical add/drop multiplexing
28 step such that the sum of the compensation amount at the
29 second dispersion compensation step and the compensation
30 amount at the first dispersion compensation step exhibits
31 a predetermined proportion to the dispersion appearing
32 in the divisional repeating interval on the terminal
33 apparatus side for transmission and transmitting a
34 resulting signal to the divisional repeating interval on
35 the terminal apparatus side for reception;

36 the ratio of the over compensation amount at the
37 second dispersion compensation step to the sum of the
38 dispersion compensation amounts at the first and second
39 dispersion compensation steps being set so as to gradually
40 vary together with the transmission distance from said
41 terminal apparatus for transmission at which said
42 repeating apparatus is disposed on said light transmission
43 line.

1 2. The wavelength division multiplexing optical
2 repeating transmission method as claimed in claim 1,
3 wherein the predetermined proportion for performing the
4 dispersion compensation process by the over compensation
5 amount at the second dispersion compensation step is set
6 so as to gradually increase together with the transmission
7 distance from said terminal apparatus for transmission
8 at which of said repeating apparatus is disposed on said

9 light transmission line.

1 3. The wavelength division multiplexing optical
2 repeating transmission method as claimed in claim 1,
3 wherein the predetermined proportion for performing the
4 dispersion compensation process of the over compensation
5 amount at the second dispersion compensation step is set
6 so as to gradually decrease together with the transmission
7 distance from said terminal apparatus for transmission
8 at which of said repeating apparatus is disposed on said
9 light transmission line.

1 4. The wavelength division multiplexing optical
2 repeating transmission method as claimed in claim 1,
3 further comprising a residual dispersion compensation step
4 executed by each of said repeating apparatus of
5 compensating, where a residual dispersion appears in an
6 optical signal of each wavelength before and after the
7 optical add/drop multiplexing process at the optical
8 add/drop multiplexing step, for the residual dispersion.

1 5. The wavelength division multiplexing optical
2 repeating transmission method as claimed in claim 1,
3 further comprising a transmission side dispersion
4 compensation step of performing a dispersion compensation
5 process which satisfies a transmission condition for a
6 wavelength multiplexed optical signal to be transmitted

7 in said terminal apparatus for transmission.

1 6. The wavelength division multiplexing optical
2 repeating transmission method as claimed in claim 5,
3 wherein the transmission condition relates to at least
4 one of the kind of fiber, the transmission distance and
5 the bit rate.

1 7. A repeating apparatus for a wavelength division
2 multiplexing optical repeating transmission system
3 wherein a terminal apparatus for transmission and a
4 terminal apparatus for reception are interconnected by
5 an optical transmission line whose repeating interval is
6 divided by a plurality of repeating apparatus to perform
7 repeating transmission of a wavelength multiplexed optical
8 signal, comprising:

9 a first dispersion compensation section for
10 compensating for a dispersion included in the wavelength
11 multiplexed optical signal having propagated in the
12 divisional repeating interval on the terminal apparatus
13 side for transmission so as to be included within a tolerance
14 set in advance;

15 an optical add/drop multiplexing section for
16 performing an optical add/drop multiplexing process for
17 each of wavelength components of the wavelength
18 multiplexed optical signal for which the dispersion
19 compensation process has been performed in said first

20 dispersion compensation section; and
21 a second dispersion compensation section for
22 performing a dispersion compensation process with an over
23 compensation amount for the wavelength multiplexed optical
24 signal for which the optical add/drop multiplexing process
25 has been performed by said optical add/drop multiplexing
26 section such that the sum of the compensation amount by
27 said second dispersion compensation section and the
28 compensation amount by said first dispersion compensation
29 section exhibits a predetermined proportion to the
30 dispersion appearing in the divisional repeating interval
31 on the terminal apparatus side for transmission.

1 8. The repeating apparatus as claimed in claim 7,
2 wherein said second dispersion compensation section
3 gradually increases the predetermined proportion for
4 performing the dispersion compensation process by the over
5 compensation amount together with the transmission
6 distance from said terminal apparatus for transmission
7 at which said repeating apparatus is disposed on said light
8 transmission line.

1 9. The repeating apparatus as claimed in claim 7,
2 wherein said second dispersion compensation section
3 gradually decreases the predetermined proportion for
4 performing the dispersion compensation process by the over
5 compensation amount together with the transmission

6 distance from said terminal apparatus for transmission
7 at which of said repeating apparatus is disposed on said
8 light transmission line.

1 10. The repeating apparatus as claimed in claim 7,
2 wherein at least one of said first and second dispersion
3 compensation sections is formed from a variable dispersion
4 compensation apparatus which can vary a set value for a
5 dispersion compensation amount.

1 11. The repeating apparatus as claimed in claim 7,
2 further comprising a dispersion slope compensation
3 apparatus for compensating for a dispersion slope
4 regarding a wavelength multiplexed optical signal to be
5 inputted to said optical add/drop multiplexing section
6 or a wavelength multiplexed optical signal outputted from
7 said optical add/drop multiplexing section of a different
8 one of the plural repeating apparatus.

1 12. The repeating apparatus as claimed in claim 7,
2 further comprising a dispersion compensator for
3 compensating for a residual dispersion amount with respect
4 to a dispersion compensation amount in said first or second
5 dispersion compensation section for each optical signal
6 of an individual channel added/dropped by said optical
7 add/drop multiplexing section.